Africa RISING - Enhancing partnership among Africa RISING, NAFAKA, and TUBORESHE CHAKULA Programs for fast tracking delivery and scaling of agricultural technologies in Tanzania

Quarterly Progress Report (1 July 2015–30 September 2015)

30 September 2015

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IITA – International Institute of Tropical Agriculture

QUARTERLY PERFORMANCE REPORT

(1 July 2015–30 September 2015)

Thematic Implementing Partners:

AfricaRice – Rice Systems

AVRDC – Vegetables

CIMMYT – Maize Systems

IITA – Postharvest and Nutrition

COVER PHOTO
Farmers in Kwadoli village, Mvomero District in Tanzania use a motorized maize shelling machine during a community training on postharvest handling of maize (Photo credit: Shabani Ibrahim/IITA)

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ACRONYMS

AfricaRice	Africa Rice Center
Africa RISING	Africa Research in Sustainable Intensification for the Next Generation
ARI-Hombolo	Agricultural Research Institute, Hombolo
AVRDC	The World Vegetable Center
CIAT	International Center for Tropical Agriculture
CIMMYT	International Maize and Wheat Improvement Center
COUNSENUTH	Center for Counseling, Nutrition and Health Care
DAICO	District Agriculture, Irrigation and Cooperative Officer
FtF	Feed the Future
IITA	International Institute for Tropical Agriculture
ILSSI	Innovation Lab on Small Scale Irrigation
NAFAKA	Tanzania Staples Value Chain Activity (USAID FtF Project)
TUBOCHA	Tuboreshe Chakula (USAID FtF Project)
VBAA	Village-based Agricultural Agent
ZOI	(FtF) Zone of Influence

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1 EXECUTIVE SUMMARY

During the fourth quarter, the Africa RISING–NAFAKA–TUBOCHA partnership and scaling project has accomplished a variety of activities. The annual review and planning meeting for the project was held in July 2015. A project management meeting was also held in the same month. In preparation for expansion of project activities in the new regions of Mbeya and Iringa, the joint team visit composed of members from the maize, vegetables, and postharvest teams as well as NAFAKA, national agricultural research institutions, and project coordination was held in August 2015. The maize team harvested the crops (maize and legumes) and farmers were able to visually assess the results while project scientists are still processing the harvest data which will be shared during the sensitization meetings that will be held during the next quarter. Seed for various promising crop varieties (legumes and maize) has also been produced, ready for delivery to farmers for planting next season. The rice team identified rice varieties (TXD 306 and NERICA L) that will be demonstrated together with good agronomic practices and water management practices next season. Work on development of prototypes for weeders and weed management tools as well as value chain activities also continued during the current quarter. For vegetables, 204 farmers located in nine pilot villages in Babati, Kiteto, and Kongwa districts were trained on harvesting and postharvest practices and technologies. Two field days were also conducted in Babati and Kongwa districts, with 90 participants in attendance. Three new sites were selected in Kilombero District (Morogoro Region) and 75 farmers were sensitized on project activities as well as receiving seed kits. The postharvest team trained 161 farmers in the districts of Kongwa, Kiteto, and Mvomero on postharvest management of maize (shelling, drying, storage, and processing of maize). To augment the potential for adoption of the technologies, 12 shelling machines, six drying cases, and 316 hermetic bags were distributed to lead farmers for use by community members.

In terms of project performance against FtF indicators, only data on output indicators is reported during the current quarter. Data on outcome indicators will be reported after planting next season when farmers will be expected to have adopted technologies as a result of previous years. For the output indicators reported against annual targets, during the current quarter, 36.5% of individuals received short-term food security training, 11.2% of private enterprises and farmers' organizations received USG assistance, 98.8% of rural households benefited, and over 400% of target households established home gardens as a result of this project. For all the achievements that are over 50% the results are largely attributed to activities of the vegetables team whose approach involves training and giving seed kits to farmers. During the next quarter, all teams will focus on community sensitization, preparation of protocols and training guides, farmer and site selection, input procurement and delivery, planting of demos, and training of farmers on some topics. Some activities will build on what has been done in the previous topics such as development of prototypes for the rice weeder and the weed advice tool. Other activities will include a stakeholders' meeting for launching scaling activities in Mbeya and Iringa regions and formation and/or facilitation of R4D/Innovation Platforms to facilitate scaling.

2 INTRODUCTION

2.1 Project description

Africa RISING partners are involved in identifying and developing best performing interventions for improving agricultural production. These are compiled into information and technology packages to be delivered through a network of NAFAKA and other public and private sector actors, creating an opportunity for mainstreaming into wider rural development programs. Attractive interventions in this project include the introduction of improved crop varieties, dissemination of best-bet crop management packages, rehabilitation and protection of natural resources, and postharvest management.

The project focus is on three crop enterprises—maize, rice, and vegetables with postharvest handling and nutrition as a cross-cutting theme. The key partners in the project include international agricultural research centers (IITA, CIMMYT, CIAT, ICRAF, and ICRISAT), AfricaRice, the World Vegetable Center (AVRDC), and two USAID-funded projects, NAFAKA and TUBOCHA. (Note: TUBOCHA project ended in June 2015 although the current project interventions build on its achievements). These work in partnership with national institutions (research and universities) as well as local government authorities, the private sector (seed companies, millers, and processors) and NGOs to deliver on the following objectives:

1. Introduce and promote improved and resilient varieties of food crops to farm households in a manner that complements their ongoing farm enterprises, contributes to sustainable agricultural resource management, and offers nutritional advantages and alternative market channels.
2. Disseminate best-bet agronomic management packages around the most promising new crop varieties suited to widely representative agroecological zones and market proximity.
3. Protect land and water resources and foster agricultural biodiversity through the introduction of soil and water management practices.
4. Increase food security and improve household nutrition among the most vulnerable households and their members, especially women and children, by introducing locally adapted and nutrient-rich vegetables.
5. Introduce and promote postharvest management technologies for maize, rice, legumes, and selected vegetable crops to reduce losses and bring quality up to market standards.
6. Offer and expand capacity services to members of grassroots farmers' associations, platform partners, and development institutions in the scaling process (capacity building), paying particular attention to the special opportunities available to women farmers as technical and nutritional innovators and resource managers.

2.2 Geographic Zones of Influence (ZOI)

During the 3-year project period, activities are being conducted in the primary regions of Manyara, Dodoma, and Morogoro, with extension to Iringa and Mbeya planned in year 2, all in the FtF's ZOI (Fig. 1). Action sites are selected according to the following criteria:

(i) The districts and villages were selected based on agro-ecological characteristics that are suitable for the selected technologies as well as availability of suitable partners.

(ii) In addition, the siting of demonstration plots for learning was guided by a combination of visibility, accessibility, and land suitability.

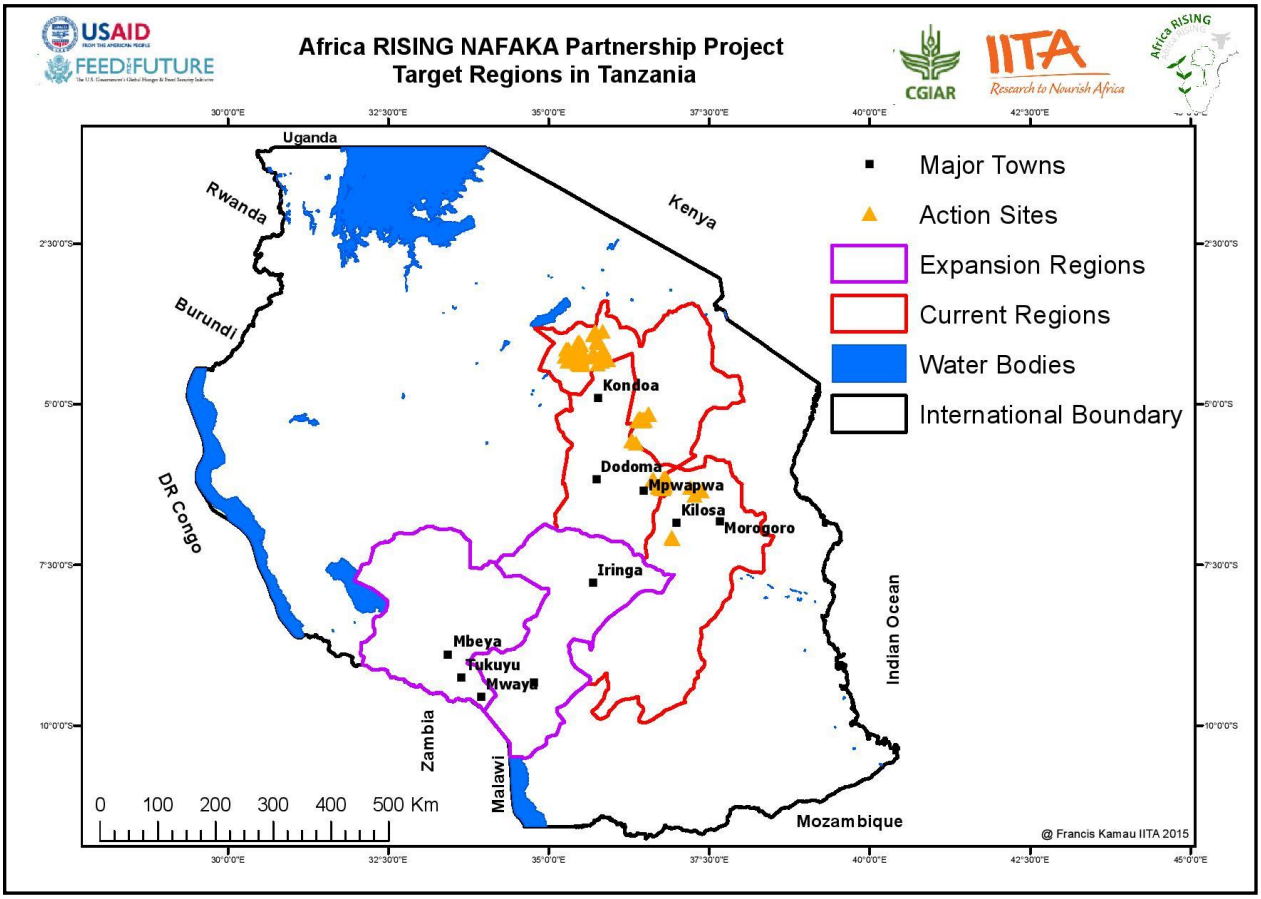

Figure 1: Project target regions in Tanzania

3 IMPLEMENTATION PROGRESS

3.1 Project Management

An annual project planning meeting was held from 8 to 10 July 2015 in Dar es Salaam to review progress and plan for the second year of the project (2015/16). Proceedings of the meeting are available at: http://africa-rising.wikispaces.com/AR-NAFAKA-TUBOCHA_rev%26plan_July2015. The project management meeting was also held in July. Minutes of the meeting are available on: http://africa-rising.wikispaces.com/file/view/PMT%20meeting%20minutes1%20-%201310.doc/562249287/PMT%20meeting%20minutes1%20-%201310.doc. The project scaling specialist also participated in the NAFAKA annual planning meeting that took place from 1 to 3 September 2015. He actively contributed to work plan development for the agricultural productivity component of the NAFAKA project.

Following plans to expand project activities to Mbeya and Iringa regions in the second year of the project, team members from the NAFAKA project and maize, vegetables, and postharvest teams visited the two regions between 17 and 28 August 2015 to assess the situation as well as meet stakeholders with whom the project will potentially work. Highlights of the visit are available at: http://africa-rising.wikispaces.com/Mbeya+%26+Iringa+scoping+visit. Arising from the visit, the maize and vegetables teams have since conducted follow up visits to identify sites and stakeholders. The maize team held a planning meeting at NAFAKA offices in Iringa on 29 and 30 September 2015 whereby they developed a detailed work plan and action plan for the maize/legumes and soil and water conservation activities for the second year of the project.

Members of the maize scaling team in discussions during their bi-monthly review and planning meeting in September 2015 at NAFAKA Offices in Iringa

(Photo credit: Gloriana Ndibalema/IITA)

Using GIS to improve scaling suitability, a geo-database for the project was designed and populated with biophysical and socioeconomic layers or their proxies from different sources. Table 1 lists the geospatial layers in the geo-database. This activity has provided a blueprint for analysis of recommendation domains for technologies which will continue into the next quarter.

Table 1: Geospatial variables incorporated in the project database

Variables	Source
Vector Data	
GPS points for demo sites	Field sampling
Administrative layers	ILRI
Protected areas	WDPA
Water bodies	ILRI
Rivers	ILRI
Distance to rivers	GIS generated
Extent of urban areas	SEDAC
Location of agro-dealers (Iringa/Mbeya)	Field sampling (NAFAKA)
Biophysical	
Topographical	
Elevation (DEM)	Aster DEM
Slope	Derived from Aster DEM
Aspect	Derived from Aster DEM
Topographical Index (TPI)	Derived from Aster DEM
Landscape	
Land use/cover	GlobeLand30 (30 m resolution)
Normalized Difference Vegetation Index (NDVI)	MODIS (250 m)
Edaphic	
Soil type	AFSIS
Soil texture	AFSIS
Soil organic carbon	AFSIS
Soil drainage	AFSIS
Soil Ph	AFSIS
Climatic	
Mean annual rainfall	WorldClim/CIAT
Rainfall seasonality (C.V.)	WorldClim/CIAT
Maximum rainfall of wettest month	WorldClim/CIAT
Minimum rainfall of driest month	WorldClim/CIAT
Mean annual temperature	WorldClim/CIAT
Temperature seasonality (C.V.)	WorldClim/CIAT
Minimum temperature of coldest month	WorldClim/CIAT
Maximum temperature of hottest month	WorldClim/CIAT
Length of growing period	NASA
Socio-economic	
Population density	AfriPop
Percentage of population living below poverty line	IFPRI Harvest Choice
Travel time to Urban Centre with population over 50000	
Malaria prevalence	MAP (Malaria Atlas Project)

3.2 Promotion of improved crop technologies and management practices

Maize system: The maize team established 29 demonstration plots of improved maize and legume varieties in the three regions as shown in Table 2. Harvesting of all the plots was completed during the current quarter. The farmers visually assessed the yields whereas the project scientists processed the harvest data whose results will be shared during the community sensitization meetings in October and November as part of the process for farmers and researchers to jointly select varieties and fertilizers for farmers' adoption/adaptation.

Table 2: Improved maize and legumes established at demonstration sites for scaling

District	**Village**	**Maize Hybrid**	**Legumes**
Babati			
	Seloto-1	MAMH913 and TZH538	
	Seloto-2	TZH538 and TZH536	
	Seloto-3	TZH536 and MAH913	
	Halu-1	TZH536 and SC 627	
	Halu-2	TZH538 and TZH536	
	Matufa	TZH536 and SC 627	
	Eyamango	MERUHB513	Beans- Uyole Njano
	Orng'adida	MERUHB513	Beans- Uyole Njano
	Duduye	MERUHB513	Beans- Uyole Njano
	Eyesam	MERUHB513	Beans- Uyole Njano
	Sangara	MERUHB513	Beans- Uyole Njano
Kongwa	Ndurugumi	NATAK6Q	Groundnuts pure stand-Mnanje and Pendo
	Chang'ombe	NATAK6Q	Groundnuts pure stand-Mnanje and Pendo
	Vihingo	NATAK6Q	Groundnuts pure stand-Mnanje and Pendo
	Ndalibo	NATAK6Q	Groundnuts pure stand-Mnanje and Pendo
	Lengaji	NATAK6Q	Groundnuts pure stand-Mnanje and Pendo
Kiteto	Esuguta	NATAH105	
	Ngipa	NATAH105	
	Mbigiri	NATAH105	
	Kaloleni	NATAH105	
	Kiperesa	NATAH105	
Kilosa	Ng'ole	TAN H600 and NATA 104	Cow pea (Vuli II)
	Ulaya	TAN H600 and NATA 104	Cow pea (Vuli II)
	Kitete	TAN H600 and NATA 104	Cowpea (Vuli II)
	Mandela	TAN H600 and NATA 104	Cow pea (Vuli II)
	Maguha	TAN H600 and NATA 104	Cowpea (Vuli II)
Mvomero	Kwadoli	NATAK6Q	Soybean-Line 8 and beans Uyole Njano
	Dihombo	NATAK6Q	Soybean-Line 8 and beans Uyole Njano
	Chigugu	NATAK6Q	Soybean-Line 8 and beans Uyole Njano
	Msufini	NATAK6Q	Soybean-Line 8 and beans Uyole Njano
	Lukenge	NATAK6Q	Soybean-Line 8 and beans Uyole Njano
	Hoza	NATAK6Q	Soybean-Line 8 and beans Uyole Njano

Farmers in Ngipa village - Kiteto District, showing maize harvests from the improved and local varieties (Phot credit: Elirehema Swai/ARI Hombolo)

In preparation for the second year of project activities, multiplication of some of the maize and legume seed that exhibited promise and that farmers are willing to adopt, was done during this quarter. Aminata seeds, one of the project partners, led this activity and established seed production fields in Kilosa District (Morogoro Region) and Handeni and Muheza districts (Tanga Region). The amount of seed produced includes two metric tonnes each for NATA H104 and NATA H105, three metric tonnes of an OPV variety NATA K6Q, 1.1 metric tonne of Lyamungo and Uyole Njano bean varieties, 650 kg of soybean line 8, and 500 kg of groundnut seed. The seed will be distributed to farmers after community sensitization meetings that will take place in October and November 2015.

For the **vegetable team,** following on training and planting activities conducted in the third quarter, harvesting and postharvest training was conducted in Manyara and Dodoma regions during the current quarter. More information is provided under the postharvest management section.

In August 2015, a field day was conducted in Sangara village (Babati District) and Songambele village (Kongwa District). The field day in Sangara was also attended by farmers from Endadosh (another pilot village from the Babati District) and farmers from Riroda village. The latter village is not a pilot village and inviting farmers from the Riroda village enabled the vegetable team to disseminate vegetable production technologies and seed kits beyond the borders of the pilot villages. The field day in Songambele was also attended by vegetable growers from Chamkoroma, one of project villages in the Kongwa District. The total attendance was 90 farmers (37 female and 53 male).

In addition, as part of the project expansion and scaling activities, the vegetable team planned to establish more demonstration plots in Morogoro and Iringa regions. Those in Morogoro Region have been established in Kilombero District (Morogoro Region). All the three villages selected are also AfricaRice sites as part of this project (Msufini, Ichonde, and Kisawasawa). AfricaRice conducted several pilot trials in these villages and asked the vegetable team to consider introducing vegetables that could be grown while using the residual moisture after rice harvesting. Since rice in these villages was harvested in July/August 2015, the nurseries needed to be established in August 2015 so that the majority of residual moisture could be used for vegetable production. Community members have already been jointly identified and contacted by the districts' subject matter specialists and the vegetable and rice teams of the project. The following activities had been conducted by the end of the current quarter:

(i) *Sensitization meetings* in all the three villages with 75 participants (39 women and 36 men in attendance (Table 3). The sensitization meetings focused on briefing on project objectives; lectures on improving nutrition based on diverse diets; introduction of new vegetable crops and varieties into household diets; impact of improved varieties and improved production practices on vegetable yields; farming as a business and possibilities to sell/market production surplus; and introduction to group dynamics. The training material was summarized in a one-page Swahili brochure that was handed out to every participant after the sensitization meeting was held (75 brochure beneficiaries in total).

Table 3: Number of farmers who participated in the sensitization meeting in Kilombero Region

District	Village		Male	Female	Total
Kilombero	Msufini		9	15	24
		% Within village	37.5	62.5	100.0
	Kisawasawa		14	11	25
		% Within village	56.0	44.0	100.0
	Ichonde		13	13	26
		% Within village	50.0	50.0	100.0
	Kilombero (total)		**36**	**39**	**75**
		% Within district	**48.0**	**52.0**	**100.0**

(ii) *Hands-on-training* on nursery practices for all the 75 participants who will then become farmer trainers in the third year of the project. The focus topics included land and seed preparation; media for raising seedlings for nursery establishment and proper use of seeds, equipment, and chemicals.

(iii) *Distribution of seed kits:* A total of three seed kits, three watering cans, 15 seeding trays, three hand sprayers, three bottles of pesticides, and three bottles of foliar fertilizer were deployed for nursery establishment. In addition, 75 seed kits were handed out to the training participants.

In the first quarter of the second year of the project, the vegetables team will continue with training activities in the three villages. The three local farmer groups will then establish the demonstration plots and transplant the seedlings from the nurseries. Another six pilot villages, three from the Morogoro Region and three from the Iringa Region, will be selected in the next quarter.

For the **rice team,** during the annual planning and review meeting that was held in July 2015, AfricaRice and the NAFAKA project discussed the varieties for demonstration which varieties to select for demonstrations. After discussions with AfricaRice and KATRIN breeders, who organized the Africa-wide Breeding Task Force, the choice for TXD306 (SARO-5) and NERICA-L was made. In collaboration with NAFAKA, AfricaRice is planning for 15 mother demos on these two varieties at three sites (five per site) with 25 learners at each site. The protocols to conduct these demonstrations were developed and a two-day training for NAFAKA field staff will be conducted in the next quarter.

In addition, implementation of the activities started during the second quarter continued. These included:

(i) *Promotion of motorized paddy weeders:* After the farmer participatory demonstrations of three models of motorized paddy weeders done during the second and third quarters, analysis of feedback collected through structured questionnaires from the participants (N = 119) was completed and work on design of the prototype will start in the next quarter.

(ii) *Development of an electronic decision support tool for farmers to aid with weed management:* The tool is still under development. The model for the tool consists of four "layers". The first layer contains all the 19 "characterizations" based on "environment" and "weed category" and 47 weed management options, divided over "pre-season", "season", and "post-season". The second layer is partitioned in two parts: "general weed advice" and a "herbicide guide". This layer presents detailed instructions on application (e.g., timing, product/technology, mode of operation) for all the 19 × 47 combinations (if relevant) from the first layer. A third layer with 29 budget and resource "characterizations", divided over "available land", "available resources", "available inputs", and "available budget" then serves as a filter that will be applied to the 19 × 47 combinations of layer 2. This will result in a limited number of feasible and locally adapted options generated in layer 4. Currently the programmers of Co-capacity are working on the generation of the first prototype of the decision support tool.

3.3 Improved household nutrition and reduction of food waste and spoilage

The **vegetables team** conducted training on harvesting, postharvest management, and nutrition whereby 204 farmers were taught how to determine the optimum maturity of the vegetable crops for harvesting to minimize crop damage during harvest. The trainings also covered sanitary measures to reduce microbial and pest infection, as well as postharvest packaging and storage practices. For leafy vegetables, training participants received an additional training session on how to dry leafy vegetables and avoid substantial nutrient losses. The harvest and postharvest training activities were followed by training sessions that aimed at sensitizing the participants on food hygiene and food safety issues. The key issues covered included hygienic practices during food preparation; preparation of vegetable meals while conserving the nutrient content; and recipes for the various vegetables.

Participants enjoying the vegetables cooked during the vegetables team cooking show in Babati district (Photo credit: Hassan Mndiga/AVRDC)

Further, the project **postharvest team** conducted a number of activities on maize which included:

(i) *Training lead farmers and demonstrations on postharvest handling of maize (shelling, drying, storage, and processing of maize):* This activity focused on improving the skills of smallholder farmers to reduce postharvest losses of crops. Specifically shelling, proper drying, and storage technologies were introduced to farmers in the three districts of Mvomero, Kongwa, and Kiteto. Six villages where NAFAKA and other project teams are present (two villages in each district) were selected for the trainings. In Kongwa District (Ndurugumi and Vihingo villages), 77 lead-farmers were trained (49 men and 28 women). In Kiteto District (Kiperesa and Ngipa villages), 43 farmers were trained (14 men and 29 women) while in Mvomero District (Kwadoli and Dihinda villages) 41 farmers were trained (21 men and 20 women). The lead farmers were trained on the use of small-scale mobile shelling machines (500 kg/hr capacity), use of collapsible drying cases for safe drying of maize, and storage of maize in hermetic storage bags. In order to enhance chances of adoption, 12 shelling machines, six drying cases, and 316 hermetic bags were distributed to Kongwa, Kiteto and Mvomero lead farmers in the six villages, respectively.

(ii) *Nutrition education training:* Development of nutrition education training material is being done, led by a project partner COUNSENUTH (Center for Counseling, Nutrition and Health Care). A training manual on how to utilize available local food for preparation of nutrition-dense food was developed; the booklet provides guidelines to members of the public on how to prepare nutrient-dense foods from the available local foods materials. The booklet is currently under review by the Africa RISING Communication Specialist. The training of community level nutrition education service providers will commence in the next quarter in Kongwa, Mvomero, Babati, and Kiteto districts. In each district, 18 service providers will be trained, including Ward community development officers (WCDO), Village health workers, and Village extension officers.

(iii) *Mapping of maize fortification practices:* This activity is ongoing in Morogoro, Dodoma, and Manyara regions (Mvomero, Kongwa, and Kiteto districts). The focus is on mapping the processors involved in nutrient fortification of maize flour, the distributors of the fortified maize flour, and the strata of consumers. The study involved collection of fortified flour and other cooked foods to evaluate the residual nutrient during marketing and the actual nutrient that becomes available in the food items at the time of consumption by households (to establish the actual amount of minerals present in the foods and what was responsible for nutrient losses). This knowledge will help Africa RISING develop strategies for improving the food fortification program in order to deliver the intended nutrition benefits to the vulnerable household members that the fortified food items are meant to benefit. Seven maize flour processors, 50 distributors, and 250 consumers have already been surveyed.

3.4 Community empowerment for sustainability

In addition to community empowerment through groups and village-based agents as part of the NAFAKA project model, Aminata Seeds Company, on behalf of the **maize team** trained five contract farmers in maize hybrid seed production techniques and four contract farmers in bean seed production techniques all located in Morogoro Region (Kilosa District – Kimamba). For the **rice team**, a value chain meeting was held in Morogoro in July 2015 and was attended by 34 actors—farmers, processors, traders, agrodealers, and rice component partners)—11 of whom were women. Three main training blocks were covered in the workshop including (1) the meaning and essence of value chains: definitions, attributes, and key elements; (2) analyzing value chains: value chain mapping, value addition, and attribution and market assessment and critical success factors; and (3) upgrading strategies on product, processes, functions, and markets in value chains: rice experimental auctions results, packaging and branding, quality standards, and contract farming. Participants also conducted fieldwork to identify constraints and opportunities for growth and learning from peers in the field. The entities visited included Dakawa Rice Scheme–Uwawakuda Cooperative Society; Intermech Ltd that manufactures farming and postharvest equipment; Agricultural Seed Agency (ASA); and Mambo ya Yesu Ltd, a processing company.

Participants in the value chain workshop on a field visit at Dakawa rice scheme, Morogoro

(Photo credit: Gaudiose Mujawamariya/AfricaRice)

The **vegetables team** normally works with district authorities and farmers' groups to implement and scale up activities; this approach continued during the current quarter. The postharvest team worked within the NAFAKA model. Also a baseline survey covering all nine pilot villages of the first project year in the Babati, Kiteto, and Kongwa districts was conducted in June and July 2015 by the vegetables team. Three hundred and sixty smallholder farmer households and 86 vegetable traders were interviewed on gender-specific allocation of vegetable production tasks, access to input and output markets as well as to market information, postharvest practices, collective action among farmers, and adoption behavior covering all nine villages. Since the data entry is still ongoing, the data set could not be fully analyzed. Results will be shared next quarter.

4 ACHIEVEMENTS AND RESULTS

General

i. An annual planning and review meeting as well as a project management meeting were held with all teams and partners in attendance.
ii. Plans for the next quarter for all three teams—rice, vegetables, and postharvest were finalized and shared with the project coordinator. The plan for rice is pending finalization because it was felt by the project coordinator that a number of rice-related activities (e.g., development of a motorized weeder and weed advice tool) do not fit well with the goal of the current project – scaling; they seem to be in research mode.
iii. Reconnaissance visits to the new project regions of Mbeya and Iringa were successfully conducted. Follow up planning activities by the different teams will be done during the current and next quarter.
iv. Development of a geo-database for the project which will form a basis for generation of recommendation domains.

Maize system

i. Yield data was collected to assess yield advantage of improved varieties under good agricultural practices and natural resource management.
ii. Requirements for strengthening community empowerment (groups, trainers, involvement of local government) started. In Babati District, meetings with farmers were done in September to prepare them for training.
iii. Strengthening seed systems: Nine contract farmers were trained in hybrid seed production.
iv. Review and planning meeting for the team held in Iringa leading to development of a work plan and action plan.

Rice system

i. Data on suitability of the weeders analyzed and activities towards development of the prototype started.
ii. Progress is being made regarding development of an electronic decision support tool for weed management. The first prototype of the tool is being developed.
iii. Value chain training conducted with 34 actors in attendance.

Vegetables

iv. A total of 204 farmers located in the nine pilot villages in the Babati, Kiteto, and Kongwa Districts were trained on harvesting and postharvest practices and technologies. The latter participants further received training covering food safety and hygiene aspects of vegetable food preparation and were taught how to prepare vegetable meals while preserving the nutrient content.
i. Two field days, one in Sangara village (Babati District) and Songambele (Kongwa District) with 90 participants were conducted.
ii. Three new pilot villages in the Morogoro Region/Kilombero District were selected. Sensitization meetings and nursery management ToT trainings were conducted in the three

new pilot villages (Misufini, Kisawasawa, Ichonde) located in the Kilombero District. The trainings reached 75 farmers in total. Three nursery plots with five crops were established in the three villages.

iii. Seventy-five seed kits were handed out to the ToT participants in the three new pilot villages located in Kilombero District, and 56 seed kits were handed out to field day-participants in the Sangara and Songambele villages, who have not received a seed kit during previous training activities.

Post-harvest

i. Training of 161 farmers in postharvest management in the districts of Kongwa, Kiteto, and Mvomero.
ii. Delivery of postharvest machines and other equipment to over 100 farmers in three districts to stimulate adoption and scaling.
iii. Development of nutrition education materials for using local foods.
iv. Finalization of plans for training of community level service providers on nutrition for the target groups of children under five and food fortification.

5 PROBLEMS AND CHALLENGES

i. Specifically on the postharvest technologies, there is a problem of management of the machines. Some farmer groups think that the machines and other postharvest facilities handed to them are theirs and no other farmers should use or have access to them. From the perspective of potential benefits to the farmers, this is a reflection of the high demand of the technologies and possible adoption. However, conflict management training for groups will be considered in the next quarter to mitigate unnecessary outcomes from the introduction of the technologies.

ii. Poor communication and coordination between sub-teams and partners: Some teams seem to want to work alone without involving NAFAKA and other partners. This needs to be worked on if scaling is to be sustainable.

iii. For the vegetables team, performance of the trainees at Kibaya Secondary School (Kiteto District) as one of the pilot sites was poor. The original idea was to train students as they will become future farmers. However, the student team neglected to assign responsibilities for the demonstration plot maintenance during school holidays. As a result, the vegetables were not watered during that period. Since it was difficult to encourage the students to set up a new trial, a farmers' group at Kibaya village started a new demonstration plot on their own, which was more successful.

iv. The vegetables team introduced African nightshade as a new crop in Sangara village (Babati District). The crop was very popular in the community. It was so popular that the whole African nightshade stock was stolen from the demonstration plot and could not be presented during the field day in August 2015.

v. Still for vegetables, Tengeru 2010, the tomato variety introduced in the demonstration plots could reach high yields with large fruits. However, although very popular among the farmers'

community due to its resistance against early and late blights, local traders neglected them in some cases and preferred the established varieties such as Tengeru 97 and Tanya.

6 PLANNED ACTIVITIES FOR QR1, Year 2

6.1 General

i. We will hold community sensitization meetings in all project hubs to facilitate potential adoption of technologies by the wider community membership. These meetings will also provide an opportunity for the project team and farmer trainers to select varieties and crop management practices in a participatory manner as well as assess training needs of the community-based farmer trainers.
ii. A stakeholders' meeting for Iringa and Mbeya regions in preparation for formal launching of project activities will be held around October 2015.
iii. After planting, the project coordination team will carry out adoption studies. Plans for the studies will be developed during the next quarter.
iv. Formation of R4D/Innovation platforms will be revived for maize and vegetables teams learning from the experience of the ongoing and previous projects in the intervention areas.
v. Further collection of data and development of recommendation domains for scaling.

Specific activities for each team include:

6.2 Maize team

i. Training of lead farmers in Kongwa, Kiteto, Mvomero, Kilosa, and Babati.
ii. Profiling of groups in non-NAFAKA districts in preparation for training in group strengthening.
iii. Involvement with community leaders in non-NAFAKA districts to select farmer trainers.
iv. Farm input mobilization and distribution to enable establishment of the demonstration sites.
v. Confirmation of demonstration sites in year 1 sites, and selection of sites in year 2 sites in all the five regions where the project will operate.

6.3 Rice team

vi. Motorized weeder work: farmer feedback data, and their suggestions for improvement, will be analyzed and used to develop a local prototype.
vii. Generation of the first prototype of the electronic decision support tool WeedManager.
viii. Training of NAFAKA staff and groups/associations.
ix. Meeting of rice value chains actors in the Morogoro innovation platform to upscale rice technologies and policy options.

6.4 Vegetables team

i. Establish three new demonstration plots in the three new pilot villages in the Kilombero District and conduct soil preparation and crop transplantation training.
ii. Finish the selection of six more project sites in the Morogoro Region and the Iringa Rural and Kilolo Districts of the Iringa region.
iii. Selection of new pilot sites in the Mvomero and Kilosa districts of the Morogoro Region

together with the International Water Management Institute (IWMI) if USAID will provide further funding for those activities.

iv. Collection of feedback from all nine previous pilot sites in the Manyara and Dodoma regions to strengthen the current training approach in general and prepare further training activities in the latter villages based on current needs.

v. Conduct first market access training activities in three of the nine pilot villages in the Manyara and Dodoma regions.

6.5 Postharvest management and nutrition team

i. A scaling strategy for the technologies will be formulated.

ii. Establishing baseline conditions for the southern highlands regions of Iringa and Mbeya for the food safety risk in terms of pesticides residue in marketed crops.

iii. Development of guidelines for community level service providers on how to deliver and store fortified maize flour in the community (delivery of fortification services for community level service providers).

iv. Train non-TUBOCHA processors on maize fortification processes. It is expected that at the end of the training, at least six new maize processors will start fortifying maize flour.

v. Preparation of a training manual on mechanical shelling and improved storage of maize and legumes. This manual will help farmers to understand and get more informed regarding harvesting, drying, processing, and storage of maize and legumes (at least three manuals and one poster).

vi. Train community level service providers to enhance their performance in delivering nutrition services for the target groups of children under five At least 18 community service providers will be trained in each district.

vii. Compile recipe for the complementary foods in project locations. At least 15 recipes will be compiled for use in the three districts of Kiteto, Kongwa, and Mvomero.

7 SPECIAL ISSUES

Some activities such as training farmers and conducting meetings are being put on hold until the general elections are conducted to avoid political opinions during these meetings that might bring about disagreements.

8 CROSS-CUTTING ISSUES

8.1 Gender integration

The project is working with men, women, and in groups. In some cases, only-women and youth farmer groups are being supported. Participation of all these categories in project activities is encouraging. For vegetable-related activities, in the previous quarterly reports it was reported that the participation of female farmers in the three pilot villages of the Babati District was quite low due to mainly external factors. For example, although women are the consumers of vegetables, they do not have access to

land and financial resources to invest in commercial vegetable production in these areas. This discourages women from being involved in vegetable production. However, further discussions with the existing farmer groups and especially the village extension officers led to an increased participation of female farmers in the field days in the Babati and Kongwa Ddistricts. Thus, 42% of the field day participants in Sangara (Babati District) were women. In Songambele, 39% of the field day participants were female farmers. Although it was not possible to reach 50% women participation, it is still a strong increase compared to the ToT-Trainings where, for example, in Sangara only 23% of the participants were women.

Female farmer participation in the meetings and trainings conducted in the three new villages in the Kilombero District turned out to be comparatively high. That is, 52% of all 75 farmers who attended the trainings in one of the three villages were female. The reasons for the different participation of women in the training activities conducted in, e.g., the Babati District and Kilombero District have not been revealed yet, but will be analyzed during the further course of this project.

8.2 Behavior change communication

The vegetables team used direct communication, interactive discussions, and experience-sharing methods during the sensitization process and during the practical trainings at the demonstration plots in addition to key informants such as district and subject matter specialists, local extension agents, and the participating farmers themselves. Farmers reported to the project team that their production practices had changed due to the project activities. According to them, in particular, the soil fertility improvement and soil preparation practices taught complemented their current knowledge and has been adopted by farmers while cultivating their home gardens. Further assessments on behavior changes will be reported in the next QR after the nine previous pilot villages in the Manyara and Dodoma regions have been visited and group discussions with farmers about the success and insufficiencies of the training sessions conducted.

In the rice-systems work, the innovation platforms established directly contribute to a behavior change as stakeholders improve their communication and mutual understanding. With the rice-based systems GAP demonstrations farmers are exposed to improved but accessible and affordable practices that will contribute to a behavior change at the field level. Rather than continuing with doing their "business as usual", we expect that farmers will change certain practices and will start seeing the opportunities of experimentation on their own farm in order to fine-tune their practices.

For the maize-related work, farmers have been engaged in different ways—holding meetings and farmer field days and their participation in field operations during implementation of demo activities. These also attract the participation of those farmers who come and observe what other farmers are doing. During the field days conducted by the maize teams it was observed that many farmers are ready to start using improved varieties and management practices as a result of the potential benefits expected from adoption. This has been confirmed in Babati during meetings with farmers to organize training for lead farmers, many more farmers were coming to ask for their participation in the project activities. Similarly in Kongwa and Kiteto, more farmers are asking for the seed of the varieties that we

are promoting. So we are seeing that demos, farmer engagement in meetings and project activities, and farmer field days are good and effective tools of communication that are delivering messages and creating interest that leads to a change in decisions by farmers leading to behavior change.

8.3. Environmental compliance and natural resource management

For vegetables, the promotion of high yielding vegetable varieties in smallholders' home gardens focuses first and foremost on increasing food security in Tanzanian rural areas and enabling farmers to produce a surplus that can be marketed on local fresh markets to increase household incomes. Using high yielding and more disease-resistant varieties combined with improved production practices such as recommended spacing to increase seedling and plant health, as well as other IPM practices may reduce the application of pesticides and chemical fertilizer. This in turn, improves the food safety of the actual produce by farmers and minimizes the contamination of soil with chemical substances. Furthermore, properly established raised seed beds as taught during the ToT training will reduce soil and water erosion in the villages.

For rice-based work, by demonstration of GAP, foliar nutrition, and rotary weeders to rice farmers, the rice-based systems team expects to contribute to reduced use and misuse of pesticides. Currently most of the pesticides used in rice are herbicides. Good agricultural practices will render the crop more competitive against weeds making farmers less dependent on weed intervention technologies. Second, by providing farmers with another labor-saving weed intervention technology, the need for herbicides will further reduce. Thirdly, the weed management decision support tool the rice-based systems team is working on will enhance the basket of options for good and efficient weed management to farmers with a lower reliance on herbicides. The use of the foliar nutrition spray and the recommendations of good and timely use of fertilizer will enable rice farmers to increase fertilizer use efficiency, with obvious benefits for the surrounding ecosystems.

In maize-based activities, we have integrated GAP being promoted to ensure sustainable use of soil and water. In addition to this, the maize team is promoting natural resource management practices such as integration of legumes in maize cropping, judicious integration of fertilizers, use of tie ridges for soil and water conservation—all meant to contribute to natural resource management. Using high yielding and more resistant varieties combined with improved production practices such as appropriate spacing to increase seedling and plant health, organic fertilizers, as well as other IPM practices may reduce the application of pesticides and chemical fertilizer which would help reduce environmental pollution.

8.4. Monitoring and evaluation

During the current quarter, only data on output indicators has been reported. After one full cycle of implementation, data on project outcomes will be generated and reported since farmers will then be expected to have adopted what they learned from the project activities during the previous year/planting season.

To standardize data collection for all teams, data collection forms have been designed (adaptations from NAFAKA data collection forms) and are being tested for reporting using tablets with the Kobocollect platform. Discussions on whether to adopt this tool or use the existing platform from the one of the project partners NAFAKA is ongoing.

9 ANNEXES

Annex 1: Performance against PMP indicators

Note: Figures reflect cumulative achievements to date. New data realized during the current quarter is highlighted in red

Indicator	FY Target	FY Achievement	% FY Achievement	% Female	% Male
1. Number of farmers and others who have applied new technologies or management practices as a result of USG assistance	625	252 0	40 0	53.2 0	46.8 0
2. Number of rice hectares under improved technologies or management practices as a result of USG assistance	580	30 0	5.1 0		
3. Number of individuals who have received USG supported short-term agricultural sector productivity or food security training	725	966 265	133.2 36.5	39.6 35	60.4 65
4. Number of food security private enterprises (for profit), producer organizations, water users' associations, women's groups, trade and business associations, and community-based organizations (CBOs) receiving USG assistance	71	42 8	59 11.2		
5. Number of rural households benefiting directly from USG interventions	775	1366 766	176.2 98.8	44.9 45.6	55.1 54.4
6. Number of beneficiaries with home gardens or alternate crops as a proxy for access to nutritious foods and income	149	797 645	534.9 432.9	44.2 46	55.8 54

Annex 11: Success Stories

See separate accompanying attachment with this report.

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I harvested 60 bags of maize despite severe drought

The success of a female farmer inspires change and interest among her peers

Mashehe Salum

Photo credit: Shabani Ibrahim/IITA

Mashehe Salum in her farm. She hopes to get better harvests this year too. *Photo credit: Shabani Ibrahim/IITA*

Mashehe Salum is a small scale maize and legume farmer in Ngipa village, Kiteto District in central Tanzania. Four years ago, maize yield from her 4 acre farm was barely enough to feed her family of five. She knew she could get more from her farm, but didn't know what to do improve her farm productivity.

Mashehe's farm is located in a semi-arid region with low and erratic rainfall. So water access was a significantly big challenge to her farming endeavor. And just like other farmers in Ngipa village, she also planted recycled seeds. Year after year, she would use the broadcasting technique to plant her maize and year after year the result would be the same –poor harvest, not adequate to feed her family.

But Mashehe's story today is a stark contrast to her story 4 years ago. She has become a model farmer for her colleagues after she harvested a whopping 60 bags of maize while her fellow farmers were once again deprived off any significant harvests, thanks to a severe drought that affected Kiteto district last year.

According to Mashehe, her life changed the moment she decided to participate in the Africa RISING-NAFAKA-TUBORESHE CHAKULA scaling project's demonstration farms. She was one of beneficiaries of a training on climate-smart farming in KIteto District they received trainings various good agronomic practices and soil water conservation strategies in semi-arid areas like Kiteto.

"We received training on planting drought resistant maize varieties, line spacing, fertilizer application and use of tied-ridges to conserve soil water. I implemented all the best practices we were trained on and I am grateful it has paid off in such a big way!" she says with a bright smile. "My fellow farmers wondered if I used *"uchawi" (magic)* in my farm since it remained green while others were drying," she adds.

Mashehe asserts that, "the higher yields from my farm were largely due to use of tied-ridges that held the little available rain water for longer period". This meant that soils were wetter for longer periods compared to neighboring farms that used flat planting.

"This time the yields are more than enough to feed my family! I intend to apply the postharvest best practices were trained on to store them and sell at the right price in order to generate school fees for my children," she explains.

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After seeing Mashehe's success, neighboring farmers are now eager to also learn the new techniques. Mashehe notes that, "Prior to the Africa RISING-NAFAKA-TUBORESHE CHAKULA scaling project, only a few villagers were interested in attending farmers' meetings, but today because they can see the benefits firsthand, mobilizing them has become relatively easy. They are now eager to learn and use the new knowledge to get better harvests from their farms."

The previous farmer's field day organized by the Africa RISING-NAFAKA-TUBORESHE CHAKULA scaling project in Ngipa village was attended by over 200 farmers. Mrs. Mashehe adds that, "this level of attendance was historic since it has never been witnessed before in Ngipa village. Even farmers from neighboring villages attended!"

The Africa RISING-NAFAKA-TUBORESHE CHAKULA scaling project is working to introduce farmers in Kongwa and Kiteto districts in Tanzania to simple seasonal in-situ water-harvesting innovations such as tied ridges, planting pits and trash lines, combined with contour planting to reduce the consequences of both heavy rainfall and short-term drought. The on-going work also integrates other aspects like nutrient management and improved maize seed varieties that are sensitive to low soil moisture. It is anticipated that this work will ensure 47,000 farmers can be able to adopt these practices through this initiative.

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Saving on labour and cutting food losses:

New postharvest technologies put a smile on the faces of Tanzania's smallholder farmers

Postharvest technologies reduce processing time, drudgery and food losses

Farmers shelling maize at Yohana Isaya's farm during a post-harvest training organized by the Africa RISING – NAFAKA scaling project in Ndurugumi village

Photo credit: Francis Muthoni/IITA

Farmers at Ndurugumi use PICS bag for maize storage

Photo credit: Shabani Ibrahim/IITA

For 56 year old Yohana Isaya, a farmer from Ndurungumi village in Kongwa District, central Tanzania; maize farming was always a losing game. A stressful, but extremely important subsistence venture. Damned if he did it, damned if he didn't. For how would he feed his family?

To begin with, shelling the maize harvest from his 5-acre plot was a back breaking job which he together with his wife and their five children couldn't do on their own. They needed the help of at least 8 extra pairs of hands to finish the job in 3 days. Isaya would then use the traditional *"Kilindo",* a small cylindrical traditional bin made from peeled *miombo* tree barks, to store his maize to be used sparingly for feeding his family. Most of the time, nearly half the stored maize would be moldy and inedible

What he didn't know then, was that there was a better way. That there were new and efficient postharvest technologies that could change the zero sum game that maize farming and storage had become to a winning one.

"Before joining the Africa RISING-NAFAKA-TUBORESHE CHAKULA scaling project activities and trainings, I was using a raised wood platform for shelling maize. Usually it took me up to three days to shell 700 kilograms. We sometimes had to ask for help from our neighbors whom we'd have to compensate by providing food, local brew and sometimes cash. But, after the project trained us on using simple to use and affordable machine like the motorized maize sheller, the same kind of work now takes only 30 minutes," explain Yohana.

But it is not only the maize shelling machines that the farmers have been introduced to. The postharvest trainings have also focused on a complete package of technologies including: collapsible drier cases capable of drying 400 Kgs of maize in five hours in the sun and storage using hermetic bags. As a result, farmers have been able to reduce the amount of time spent on crop processing, reduced food losses and improved food security in their households.

The Africa RISING-NAFAKA-TUBORESHE CHAKULA scaling project aims to scale the use of postharvest technologies among 47,000 Tanzania smallholder farmers.

Recent studies in the semi-arid areas of northern and central Tanzania have shown that: 20-40% of grains and legumes are usually lost during harvesting; a further 5% is lost during shelling-even

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when the amount of grains shelled per day was very small due to drudgery and lack of improved shelling technologies; a further 15-25% is lost during storage. Practices like drying crops on bare floor also often lead to contamination and storage when the moisture contents are high leading to deterioration. It is these challenges that made the project to introduce postharvest technologies to the Tanzania farmers.

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Tanzanian farmer cashes in on new tomato variety

Higher incomes for farmers, a new tomato variety for consumers

Farmers take a look at the tomato variety Tengeru 2010 which has been well received by farmers and consumers in Tanzania.

Photo credit: Hassan Mndiga/AVRDC

Amri Simon (center) receives the improved tomato variety seeds from a representative of the World Vegetable Centre (AVRDC). Simon was able to increase his revenue from tomatoes by 50% due to cultivating Tengeru 2010.

Photo credit: Hassan Mndiga/AVRDC

Take a trip to Songambele village in Kongwa District of the Republic of Tanzania, you will find a beaming farmer – Amri Simon. He has just recently harvested and sold tomatoes (harvested from his home garden plot) and made a cool revenue of TShs 450,000. This includes a good profit margin, one that Simon believes he will even better in the next coming season.

But it wasn't always like this. After several years previously growing tomatoes, the highest revenue Simon had ever made with tomatoes from his home garden plot was TShs 300,000. And even this was only when he was lucky enough to go through a planting season without his garden plots getting attacked by pests and diseases.

Like the name of his village *Songambele* which in Kiswahili literally means *"moving forward*", Simon has decided to move his farming to the next level by adopting the new tomato variety *Tengeru 2010* coupled with newer and better agronomic practices.

Through the Africa RISING-NAFAKA-TUBORESHE CHAKULA scaling project funded by USAID, smallholder farmers in Tanzania like Simon are being empowered with new technologies such as improved tomato varieties and trainings on good agronomic practices (GAP) during nursery management, soil enhancement and pest and disease control.

"I learnt a lot during the training, for example how to identify certain pests and diseases in order to address them at an early stage or how to apply the right spacing," explains Simon.

"However, the most important thing I did was the introduction of *Tengeru 2010* as a new tomato variety on my farm. I am now able to harvest thirty (20 liter) buckets of tomatoes instead of just twenty buckets, which I used to get previously from the same area. Since I can sell each bucket for TShs 15,000, my revenue increased by TShs 150, 000," he adds.

Simon's confidence in the commercial potential of the new tomato variety is buoyed by the fact that demand for *Tengeru 2010* in the fresh local markets close to his village is on the rise. In fact the demand is higher than the supply at the moment.

"People really like the big fruits and the slightly salty taste of this variety," he explains.

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The project team has encouraged the trainees to promote this variety as it has properties which the processing-type varieties do not have. The thicker shelf and a slightly salty taste make *Tengeru 2010* a preferred crop for raw consumption, for example in salads. These properties have even convinced private seed companies to start producing *Tengeru 2010* seeds as a measure to respond to the demand by farmers early. Thankfully this development will also help address the challenge of access to seeds which remains as a significant hindrance to a majority of small holder farmers in Tanzania.

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A healthy veggie revolution growing in Tanzania

African nightshade introduced to improve nutrition and income

A female farmer from Sunya village in Manyara region holds a bundle of African nightshade harvested from the Africa RISING-NAFKA-TUBORESHE CHAKULA scaling project's demonstration plots. African nightshade is rich in Vitamin A and micronutrients.

Photo credit: Hassan Mndiga/AVRDC

Farmers in Sunya village harvesting the African nightshade variety 'Nduruma' introduced to the community by the World Vegetable Center (AVRDC) and HORTI-Tengeru under the Africa RISING-NAFKA-TUBORESHE CHAKULA scaling project.

Photo credit: Hassan Mndiga/AVRDC

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When Omary Poputo tasted the African nightshade for the first time, he said: "I have neither seen nor tasted this vegetable before, but for sure it is definitely one of the best leafy vegetables I have ever tried."

Omary hails from Sunya village located in Kiteto District, central Tanzania and is one among the 152 lead farmers spearheading a nutritious veggie revolution in this rural community in central Tanzania with the help of staff working on the Africa RISING – NAFAKA and TUBORESHE CHAKULA scaling project funded by USAID.

Through the project, farmers in nine villages located in Manyara and Dodoma regions of Tanzania have been introduced to Amaranth and African nightshade farming. From the 152 initial vegetable farmers who were trained by the project as "lead farmers"; the project has had a multiplier effect and in the process attracted nearly five times the number of initial farmers in both regions to start growing Amaranth and African nightshade. Currently over 650 farmers are engaged in growing these two nutritious vegetables.

Why Amaranth and African nightshade? The two vegetables are much richer in Vitamin A and micronutrients like iron than the most wide-spread leafy vegetables in Tanzanian villages like the Chinese cabbage and Ethiopian mustard. Deficiencies of in particular Vitamin A can cause night blindness for adults and may reduce bone growth for children. Increasing the intake of Vitamin A is therefore an important objective in Africa in general and Tanzania in particular. According to UNICEF one third of children under the age of 5 are vitamin A deficient in Tanzania and conversely 130 children die every day in the country because they are malnourished.

For Omary, it is the sweet taste of the nightshade variety called *'Nduruma'* that convinced him this was a good vegetable variety that could be enjoyed by all in the family; especially children under five years who require high Vitamin A intake. Farmers on the other hand appreciate the drought tolerance abilities of *'Nduruma'*.

Omary notes that: "this high drought tolerance capability coupled with the lovely taste enables 'Nduruma' to become a variety that might just soon replace other more popular but less nutritious vegetable varieties".